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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/254,118	05/19/1999	KOHEI TATSUMI	52433/544	6494
26646	7590	12/03/2003	EXAMINER	
KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004			CHAMBLISS, ALONZO	
			ART UNIT	PAPER NUMBER
			2827	

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/254,118

Applicant(s)

TATSUMI ET AL.

Examiner

Alonzo Chambliss

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/14/03 has been entered.

### ***Response to Arguments***

2. Applicant's arguments filed 11/14/03 have been fully considered but they are not persuasive. The arguments are not persuasive because Le Coz teaches metal balls smaller than .030 inches (i.e. 60 to 150 micrometers) (see col. 1 lines 63-65), since Le Coz states that the metal balls can be smaller than what is utilized in the disclosure.

In regards to the excess metal balls removed by applying vibration. Le Coz teaches utilizing a vacuum to assure positive retention. Furthermore, the reference teaches that in a normal environment procedure that excess metal balls removed by applying vibration (see col. 5 lines 24-38). Therefore, the reference as a whole teaches the claimed invention.

In regards to the a partial plating process, which is not a wet process and only requires relatively simple equipment causing no environmental problems with improved freedom of material selection. The claims are not so limited in scope.

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***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-3, 7, 8, 10, and 11 are rejected under 35 U.S.C. 102(e) as being anticipated by Le Coz et al. (U.S. 5,762,258).

With respect to Claim 1, Le Coz teaches arranging metal balls 15 (i.e. metal spacer elements) at selected portions 55 (i.e. lower pads) that are located at selected portions of a substrate 51 for mounting semiconductor devices (i.e. printed circuit board) thereon (see Fig. 6). Le Coz teaches metal balls smaller than .030 inches (i.e. 60 to 150 micrometers) (see col. 1 lines 63-65), since Le Coz states that the metal balls can be smaller than what is utilized in the disclosure. The metal balls 15 are adhered to the selected portions 55. The metal balls 15 are melted to form a plated layer (i.e. a metal diffusion) thermally diffused with the selected portions 55 of the substrate 51. Thermally diffusion means using heat in a diffusion bonding process for joining metals by using only heat and pressure to achieve - atomic bonding. While, reflow process in Le Coz means a union made between two metals by melting to resolidifying two metals (i.e. metal balls 15 and selected portions 73 of printed circuit board 71) together. The

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pressure from the weight of printed circuit board along with the heat creates a thermally diffused atmosphere. Therefore, Le Coz teaches thermally diffusion, since reflow provides a union between two metals by ' 1. melting to resolidifying two metals (i.e. metal balls 15 and selected portions 73 of printed circuit board 71) together while the pressure from the weight of printed circuit board pressed against the metal balls. The selectively plating of the selected portions 55 of - the substrate 51 for electronic devices (i.e. printed circuit board) with a different metal 63 (i.e. solder flux) of the electronic device 71 (see col. 6 lines 1-14 and 40-65 and col. 7 lines 1-1 5).

With respect to Claim 2, Le Coz teaches metal balls 15 held on an arrangement base plate 11, 21, 31 having through holes 13, 23, 35 provided at positions mounting electronic devices. The base plate 11 is transferred above the substrate 51 for mounting electronic devices 71. The metal balls 15 are provisionally adhered and held by the through holes 13, 23, and 35 to the portions 55 needed to be plated (see Figs. 1-5).

With respect to Claim 3, Le Coz teaches a provisionally arranging and holding - procedure, wherein excess metal balls 15 are adhered to the arrangement base plate 11, 21, 31 and removed by applying vibrations from the suction of the arrangement base plate 11, 21, 31, thereby provisionally arranging and holding the metal balls 15 (see col. 5 lines 24-38., Figs. 1-5).

With respect to Claim 7 and 8, Le Coz teaches a substrate 51 for electronic device is an insulating resin or a ceramic material and the selected portion are wiring composed of copper. The balls 15 are held in holes 13 of base plate 11, which are connected to the copper wiring (see col. 1 lines 27-55).

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With respect to Claim 10 Le Coz teaches wherein the metal balls 15 are 1 soldered and the metal balls 15 are melted by reflowing to selectively plate the selected portions 55 of the substrate 51 for electronic devices 71 and with a metal layer 63 (i.e. solder flux) different from the substrate metal (i.e. metal layer 55) and the ball metal 15 intervening between the substrate metal and the ball metal 15 (see col. 6 lines 1-14 and 33-64 and col. 7 lines 9-20., Fig. 5).

With respect to Claim 11, Le Coz teaches wherein the metal balls are made of Sn alloy (i.e. 63Sn37Pb) and the selected metal balls 15 are melted by reflowing to selectively plate the selected portions 55 of the substrate 51 for electronic devices 71 corresponding to the portions 55 to be plated with the substrate 51 for electronic devices 71. The base plate 11, 21, 31 is transferred above the substrate 51 for with a different metal 63 (i.e. solder flux) (see col. 6 lines 1-14 and 33-60 and col. 7 lines 9-20, Fig. 5).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

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were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 4, 6, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Le Coz et al. (U.S. 5,762,258) as applied to claims 1 and 3 above, and further in view of Dunaway et al. (U.S. 4,980,240).

With respect to Claim 4, Le Coz discloses vacuum through apertures 33, which assures retention of metal balls 15 with holes 13. Therefore, one skilled in the art would readily recognize in the environment of Le Coz where the suction head 11, 21, 31 sucks the metal balls 15 in a vacuum that an ultrasonic vibration is used, since in a vacuum the force of the air would cause the suction head to vibrate by ultrasonic vibration to force the desired ball to fit into the holes 4 of the suction head and the excess metal balls removed as shown by Le Coz. With respect to Claims 6 and 9, Le Coz fail to disclose metal balls made of gold and a substrate for electronic devices is a lead frame composed of copper with the leads of the lead frame are partially plated. However, Dunaway discloses balls 80 made of gold and the substrate for the electronic devices is a lead frame composed of copper with the leads 76 of the lead frame are partially plated (see col. 5 lines 49-61 and col. 6 lines 5-20). Therefore, it would have been obvious to one of ordinary skilled in the art would readily recognize incorporating balls made of gold and a lead frame with the device of Le Coz, since the balls can be attached to a

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lead frame and a plated lead would have added the benefit of the plating material for adhesion to the ball to provide a good electrical connection, as shown by Dunaway.

The prior art made of record and not relied upon is cited primarily to show the process of the instant invention.

### ***Conclusion***

7. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

AC/November 30, 2003



Alonzo Chambliss  
Patent Examiner  
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